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CHEMICALS AND FOOD

High-quality vegetables and fruits the year round would not be possible without chemicals. The variety of wholesome foods available in our markets at reasonable cost makes possible the good diets enjoyed by people of the United States. N-24672

Chemicals are essential in providing an abundance and variety of wholesome, low-cost foods. Used in many ways--to nurture crops and livestock, to destroy pests and kill weeds, to cure and heal, preserve and clean--chemicals help assure the people of the United States a nutritional status as high as any in the world.

Agricultural and food chemicals in use today are the products of many years of research by the U. S. Department of Agriculture, the State Agricultural Experiment Stations, and the chemical and food industries. The effect of these chemicals--particularly pesticidal chemicals with residual properties--on the quality and wholesomeness of our food and on the health of consumers has always been a basic consideration in this research.

Both safe and effective use of pesticidal chemicals in food production is supported by the Department through many avenues--through research and recommendations, educational efforts, and through the laws and regulations for which Department agencies are responsible.

Even so, each year losses of about \$3 billion are caused by hordes of insect pests that chew, suck, bite, and bore away at our food and feed crops and livestock. Bacteria, viruses, fungi, nematodes, and weeds destroy another \$7 billion, making a total production loss of about \$10 billion.

Without chemicals, these losses would be much greater. Chemicals not only give our farmers and the food industry the means of dealing with day-to-day



People in some countries lunch on a dish of corn meal. The limited diets typical in many underdeveloped areas often result in arrested growth and poor bone development in young people. Uncontrolled pests reduce limited food supplies still further and may bring about famine. BN-10827X

pest problems--they also serve to eradicate such dangerous pests as the Mediterranean fruit fly and the ticks that cause cattle fever.

If we did not use these chemicals, production of many of our common fruits and vegetables would be impractical; quality of most foods would be poor. Over all, our total food supply would be drastically cut. The threat of disease would grow; the economy and well-being of our Nation would be seriously affected.

U. S. DEPARTMENT OF AGRICULTURE
Office of Information

Picture Story No. 127
August 1960

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A grasshopper's potential for damage is illustrated in this closeup of a nymph. Grasshopper outbreaks in the U. S. piled up crop damage estimated at \$315 million during 1934-38. Since 1942, chemical-control measures have saved an estimated \$35 million worth of crops annually from this pest. N-27722



Tomato fruitworms can take a \$15-million bite out of the South's annual tomato harvest. Losses can be equally heavy in the North in seasons favorable to the insect. By using insecticides with other pest-control measures, growers can cut losses 90 percent or more. BN-3793



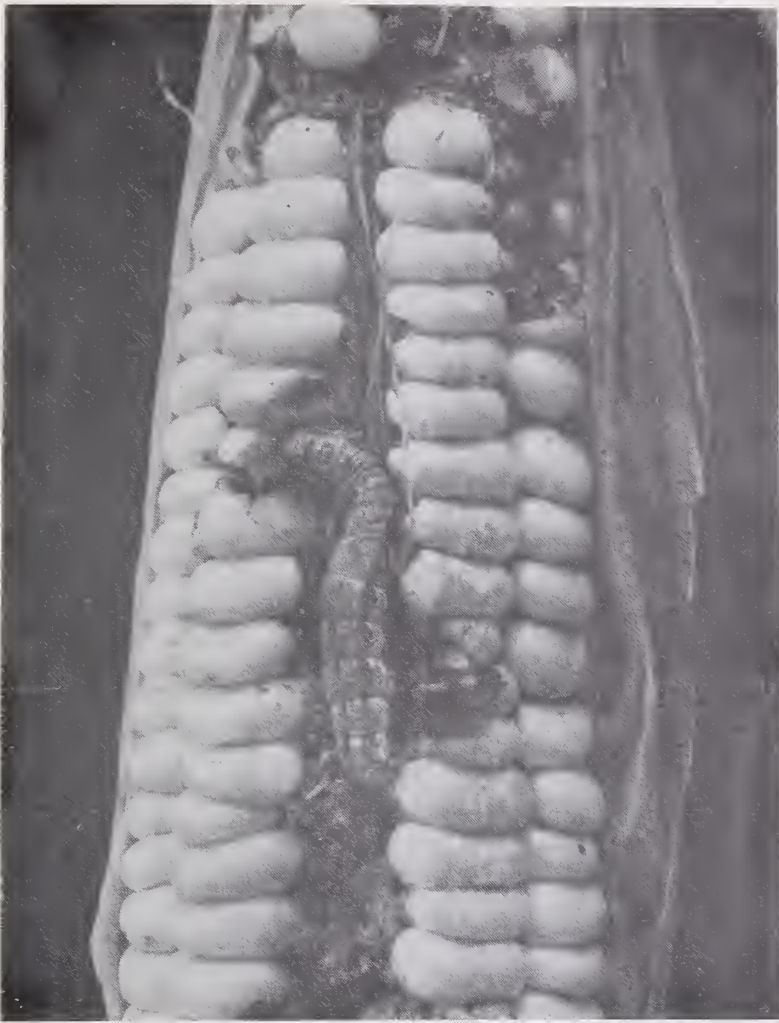
Plane sprays insecticide on rugged rangeland as protection against grasshoppers. Such fast action with effective chemicals stops grasshopper outbreaks before they can get started. BN-6520



Damage as severe as this by European corn borers could bankrupt farmers. Fortunately, chemicals properly used can prevent such destruction. Still, this one insect destroyed an estimated \$72 million worth of U. S. corn in 1959. C & F-5892



To produce nutritious leafy greens on this scale farmers must use herbicides. Chemical weeding saves spinach farmers in Mississippi as much as \$162 per acre. Cost of hand weeding would price these greens out of the market. N-11485



Corn earworm at work. This pest caused an annual loss of more than \$4 million to sweet corn during 1942-51. When chemicals are used to keep earworms under control in the South, fewer of the insects migrate to infest crops in the North. C & F-4977



Harvesting sweet corn on this scale in Florida would be impossible without chemical treatment against corn earworms. The insecticide DDT has been the making of the sweet corn industry in the South. It's a \$10 — million crop in Florida alone. N-26462



Losses due to onion thrips have been reduced by more than half since 1946, when DDT came into use. Onion-seed growers can now produce up to 1,000 pounds of seed per acre, compared to about 400 pounds without chemicals. BN-10462X



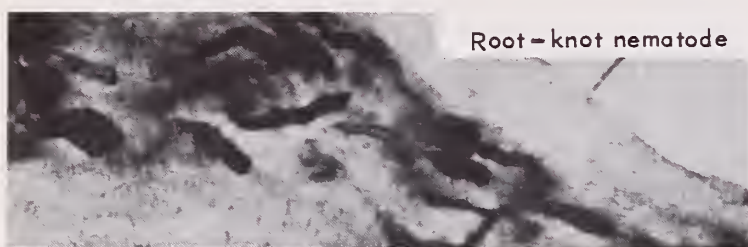
Sweetpotatoes infested by weevils are unfit for human consumption, and even livestock refuse to eat those heavily infested. Louisiana losses of about \$3 million in 1946 were reduced to \$340,000 in 1951 by use of insecticides and other sanitary measures. N-8399



A sample of the \$15-million winter celery harvest from the Florida Everglades. Hand weeding celery now costs up to \$50 per acre and costs are going up. Research-developed chemical herbicides promise to save 80 to 90 percent of this expense. N-26437



Potatoes are attacked by diseases and insects at every stage from seed bed to storage bin. Major production pests are blights, nematodes, wireworms, the potato beetle, aphids, and the potato psyllid, all controllable with chemicals. BN-10410X



Root-knot nematode



Golden nematode cysts



Lance nematode

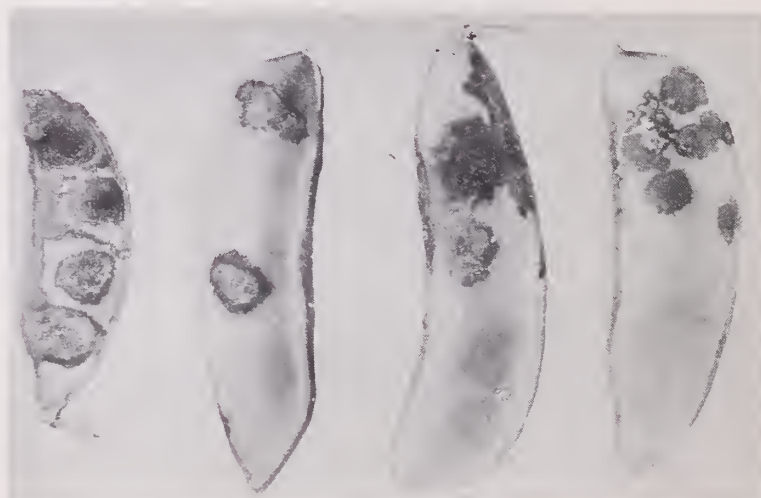


Spiral nematode

Chemicals are used also to fight the hundreds of species of parasitic nematodes that attack crops. Here are four types of the tiny worms--usually no bigger than a grain of salt--which cost farmers more than half a million dollars each year. PN-593-4-5-7



Repeated spraying is necessary to bring healthy "spuds" to the dinner table. Late blight disease caused the Irish famine of 1845. Without chemical treatments it could wipe out the U.S. potato crop in years when conditions favor the disease. BN-7201X



Even with pesticides it is difficult to get a good crop of lima beans to market. The specimens shown here are damaged by common blight, a bacterial disease. The Mexican bean beetle alone takes a toll of \$3.5 million from bean growers. M-6078



Fumigation of soil, using gravity-flow equipment, is effective against nematode pests of crops grown in closely spaced rows, such as tomatoes and celery. N-28652



No one wants wormy, rotten apples. But we'd have to accept the worms and the disease damage - - or do without apples - - if protective chemicals were not used. In unsprayed orchards losses of fruit run up to 99 percent. BN-10336



Systematic application of pesticides is necessary also to produce peaches, cherries, and other stone fruits fit for market. Unless controlled by chemicals, brown rot alone would take all the eastern-grown peaches. EPQ-1374



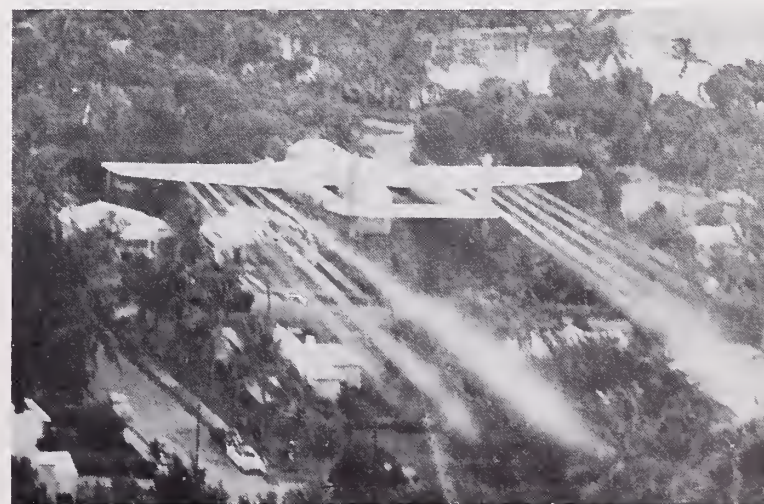
To produce strawberries like these, and other small fruits, farmers must use insecticides, fungicides, fumigants, and herbicides. Without chemical aids such fruit would disappear from our markets. BN-10826X



Fumigating fruit trees inside tents has eradicated the Hall scale in California. This imported pest was a threat to the entire stone-fruit industry of this country. BN-5344



The U. S. fought the 1929 invasion of Florida by the Mediterranean fruit fly by destroying much of the citrus crop. Infested fruit was collected and dumped into trenches and destroyed with lime, as pictured here. BN-10381X



When the Medfly invaded Florida again in 1958, a research-developed spray containing an attractant and an insecticide applied by air eradicated the pest without commercial losses of fruit. N-18517



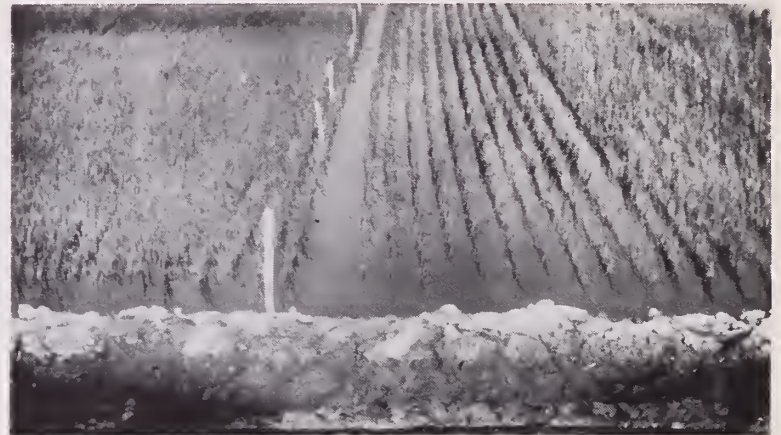
Growers lose money when fruit drops to the ground before it fully ripens. Spraying with growth-regulating chemicals keeps fruit on trees until ready to pick. M-694



Greenhouse growers of out-of-season fruits and vegetables could not stay in business without chemical protection for their crops. Aphids, mites, and other plant pests breed rapidly under confined conditions. N-11720



The parasitic witchweed, a new pest in the U. S., badly damaged this cornfield. Chemical weed killers are now helping in the fight to eradicate witchweed. If this pest should reach our Midwest corn belt, it could do incalculable damage. N-22262



Chemical control of barnyard grass, a serious weed in rice fields, has increased average rice yields 20 to 50 bushels per acre in experiments at the Arkansas Agricultural Experiment Station. This picture compares a treated rice paddy (right) with untreated. BN-10580X



Twenty-five mesquite trees per acre on rangeland can cut production of grass forage in half. Spraying infested southwestern rangeland with herbicide gives good control of mesquite and returns ranges to full production. Effective chemicals are being developed also for use against halogeton, sagebrush, and other rangeland weeds. BN-8057



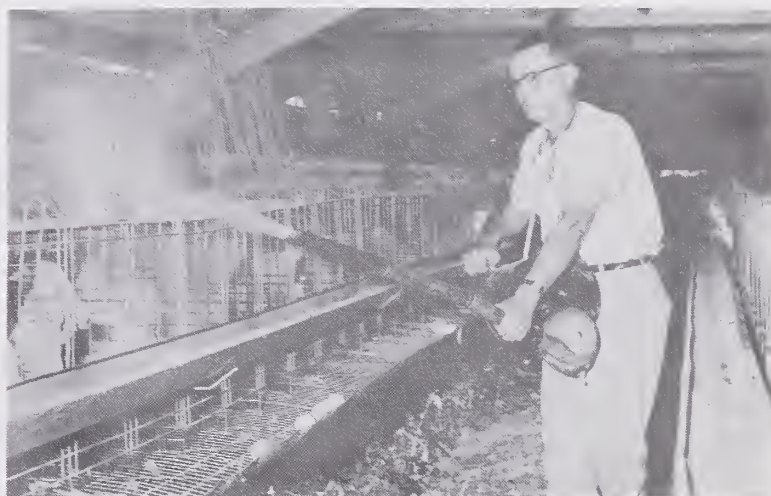
Dipping cattle in an insecticide kills ticks and protects the animals against cattle fever. This practice helped eradicate fever ticks from the South. The result: upgrading of the South's cattle stock and growth of a profitable livestock industry. N-22067



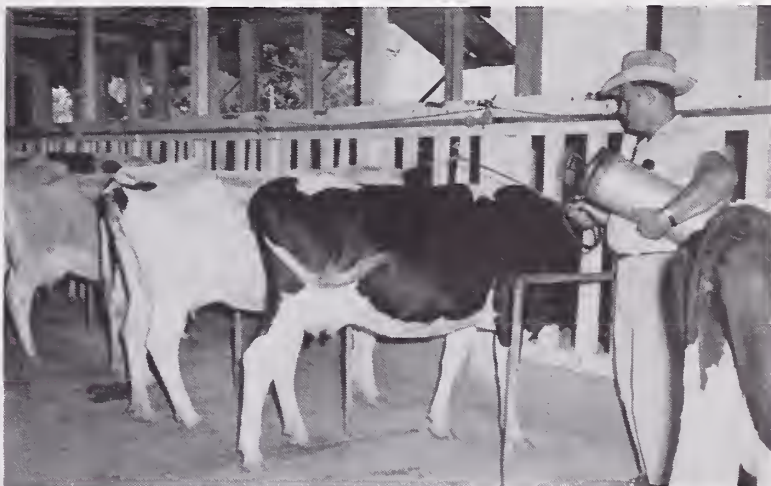
Scabies mites cause losses of wool and sometimes death if sheep are not dipped in a chemical solution. Losses of sheep and wool from such other pests as bots, ear ticks, keds, and lice are estimated at over \$20 million a year and would run much higher without chemical control. BN-7785X



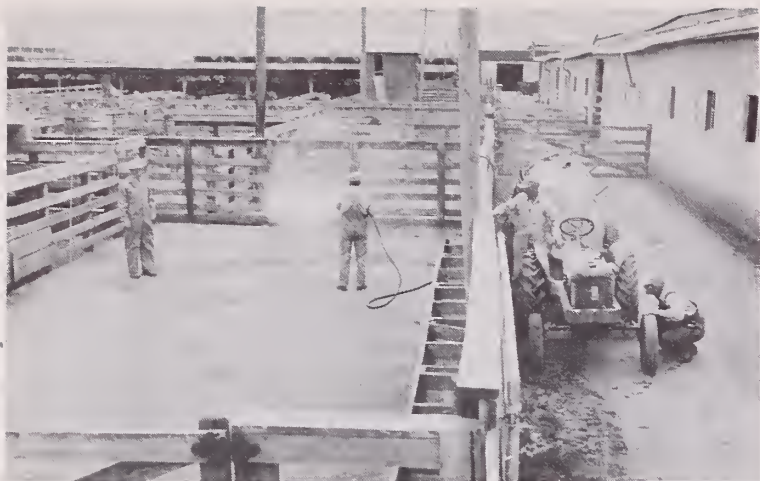
A research-developed systemic insecticide, sprayed on cattle, protects them against grubs and screwworms. Buyers frequently dock grubby cattle as much as \$1 per 100 pounds below the normal market price. BN-10409



Lice and mites would make egg and poultry production unprofitable if chemical protection were not available. Chemicals are also important in treating poultry against internal parasites and diseases. M & A-14079



Dairy cattle protected against flies yield 10 to 20 percent more milk. Pyrethrum applied to cattle with a hand sprayer is one of the treatments recommended by USDA. M & A-13465



Chemical disinfectants help to keep pens and barns clean and prevent spread of livestock diseases. In this public stockyard power equipment is used to apply chemical to disinfect pens that have been occupied by animals found to be diseased. N-32717



This is Sitophilus--a grain weevil--one of the host of insects that attack stored food and feed. Despite control efforts these and other pests destroy an estimated 300 million bushels of stored grain every year. N-10145



Losses of stored products because of insects would be much higher without chemical protection. The entomologist in this picture is fumigating stored grain. When liquid chemical is sprayed onto the surface of the grain, a gas forms and diffuses downward to kill pests inside the bin. N-4063



Barley infested with khapra beetles. This recent foreign invader of the United States is the world's worst pest of stored grain. It continues to threaten billions of bushels of grain, seed, and feed stored in this country. Only chemicals keep it in check. BN-9595X



Entire warehouses must be covered with gastight tarpaulins and fumigated with a chemical insecticide to eradicate the khapra beetle. This is the only practical way to fight this pest. BN-2083



Plant materials arriving from other countries are fumigated to meet U. S. quarantine regulations. Chemical treatment of plants destroys pests and so contributes to active and profitable commerce between our own and other countries. N-22935